LEVEL news

Volume 30 | Number 11 | November 2022

Great Lakes – St. Lawrence River Water Levels

All the Great Lakes continue their seasonal decline

During October, the Great Lakes Basin experienced the following:

- The mean monthly water levels of all the Great Lakes were above average, except Lake Ontario, which was below average.
- All the Great Lakes received lower than average precipitation.
- Lake Superior experienced drier than average water supply conditions, whereas Lake Michigan-Huron experienced average conditions. Lakes Erie and Ontario experienced much drier than average water supply conditions.
- Lake Superior's water level declined by more than twice its average in October. Lake Michigan-Huron's level decreased close to average throughout October. Lake Erie's water level decrease a bit more than average, while Lake Ontario experienced a slightly lower than average monthly decline.

Great Lakes water level information:

October 2022 monthly mean levels

Lake	Level[a]	Compared to October monthly average (1918–2021)	Compared to October 2021	Compared to record high (1918-2021)	Notes
Superior	183.60 m	8 cm above	11 cm above	31 cm below	-
Michigan–Huron	176.60 m	14 cm above	31 cm below	90 cm below	-
St. Clair	175.02 m	23 cm above	36 cm below	71 cm below	-
Erie	174.32 m	23 cm above	35 cm below	62 cm below	-
Ontario	74.41 m	21 cm below	37 cm below	81 cm below	-

[a]Water levels are referenced to International Great Lakes (Vertical) Datum 1985 (IGLD85). For more information, please visit International Great Lakes Datum Update – Great Lakes Coordinating Committee at https://www.greatlakescc.org/en/international-great-lakes-datum-update/

At this time of year, all the lakes are typically continuing their seasonal decline. Lake Superior water levels are expected to remain above average under typical and wetter than average water supply conditions, while drier than typical conditions may cause levels to drop to below average by late fall or early winter. The water levels of Lakes Michigan-Huron and Erie are expected to remain above or close to average under most water supply scenarios. Lake Ontario levels are below average, but would move to above average levels under wetter than average conditions. However, average or drier than average conditions could result in continued lower than average levels within the next few months.

With water levels remaining above average in some lakes and the possibility of large storms and winds, low-lying areas are at risk for accelerated coastline erosion and flooding. For current information and forecasts, please refer to the sources listed below.

Great Lakes water level information: October lake level changes[a]				
Lake	**October lake level change (1918–2021)**	**Long-term October monthly average change (1918-2021)**	**Compared to average change (1918-2020)**	**Notes**
Superior	7 cm decline	3 cm decline	more than the average decline	-
Michigan–Huron	8 cm decline	7 cm decline	more than the average decline	-
St. Clair	17 cm decline	10 cm decline	more than the average decline	-
Erie	13 cm decline	10 cm decline	more than the average decline	-
Ontario	10 cm decline	11 cm decline	less than the average decline	-

[a] Lake level changes are based on the differences in levels at the beginning of the months and not the monthly average levels.

Great Lakes water level information: Beginning-of-November level[a]					
Lake	**Level[a,b]**	**Compared to October monthly average (1918–2021)**	**Compared to October 2021**	**Compared to record high (1918-2021)**	**Notes**
Superior	183.57 m	7 cm above	13 cm above	30 cm below	-
Michigan–Huron	176.58 m	16 cm above	27 cm below	89 cm below	-
St. Clair	175.22 m	26 cm above	42 cm below	68 cm below	-
Erie	174.28 m	23 cm above	44 cm below	62 cm below	-
Ontario	74.37 m	19 cm below	46 cm below	84 cm below	-

[a]At the beginning of November all of the Great Lakes were at least 18 cm above their chart datum level. Chart datum is a reference elevation for each lake that provides more information on the depth of water for safe boat navigation on the lakes. For more information, please visit Low Water Datum – Great Lakes Coordinating Committee at https://www.greatlakescc.org/en/international-great-lakes-datum-update/low-water-datum/

[b]Water levels are referenced to International Great Lakes (Vertical) Datum 1985 (IGLD85). For more information, please visit International Great Lakes Datum Update – Great Lakes Coordinating Committee at https://www.greatlakescc.org/en/international-great-lakes-datum-update/

Water levels forecast

At this time of year, all the lakes are typically continuing their seasonal decline

Lake Superior is currently above its average level and is expected to remain so under average water supply conditions. Drier than average conditions could result in lake levels dropping below the long-term seasonal average, while wetter than average conditions would result in lake levels continuing to be above average.

Lake Michigan-Huron is expected to remain above average under most water supply conditions.

Lake Erie levels are expected to stay above average under most water supply scenarios.

Lake Ontario levels are below average and are expected to remain so under typical or drier than average water supply conditions within the next few months. Water levels could move above average if wetter than typical water supply conditions are experienced.

For more information on the probable range of water levels, consult https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data/levelnews-great-lakes-st-lawrence.html#projection.

For a graphical representation of recent and forecasted water levels on the Great Lakes, refer to https://www.tides.gc.ca/en/monthly-water-level-bulletin-great-lakes-and-montreal-harbour.

October basin statistics			
Lake	**Precipitation (percentage of LTA) [a,b]**	**Net basin supply (probability of exceedance) [c,d]**	**Outflows (percentage of LTA)[a]**
Superior	84%	68% (dry)	120%
Michigan-Huron	91%	53% (average)	109%
Erie (including Lake St. Clair)	44%	86% (very dry)	108%
Ontario	52%	88% (very dry)	98%

[a] As a percentage of the long-term average (LTA).
[b] United States Army Corps of Engineers (https://lre-wm.usace.army.mil/reports/greatLakes/greatLakesPrecipitationLastMonth/greatLakesPrecipitationLastMonth.html)
[c] <5% extremely wet; <25% very wet; <45% wet; 45-55% average; >55% dry; >75% very dry; >95% extremely dry.
[d] Please refer to the LEVELnews "What is net basin supply" (https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data/levelnews-great-lakes-st-lawrence.html#projection) for a description of net basin supply.
Note: The figures contained in this report are provisional and are subject to change. Data are calculated from the best available observations at the time of posting.

Fall and winter storms

The fall and winter can bring higher waves and storm surges on the Great Lakes. Winds blowing across long open water sections, or fetch, can cause large waves and push water levels up on the downwind side of the lakes creating a storm surge.

The largest waves occur on Lake Superior, where wave heights have approached 9 m. The largest storm surge occurs on Lake Erie, with the largest being about a 2.5 m rise. Although waves and storm surges are usually well below these maximums, they can create rapid changes in water levels that should be considered when undertaking activities on the shores of the Great Lakes.

In the coming months, the above-average levels of lakes Superior, Michigan–Huron and Erie could increase the potential for erosion of some shorelines, especially steep shoreline bluffs made up of silts, sands, gravels and cobbles that are exposed to waves. Although erosion around the Great Lakes can cause significant changes to the shoreline that can impact property and activities around the lakes, it is also a naturally occurring process that helps support shoreline dynamics such as beach building and the natural ecosystem of the Great Lakes.

Keep in mind that conditions can change quickly along the shores of the lakes and this can lead to dangerous conditions, especially if you are not prepared. Check the local forecasts and always keep a safe distance from the shoreline edge.

Flood information

With water levels remaining high on some lakes, there is a high risk of flooding. Great Lakes water levels are difficult to predict weeks in advance due to natural variations in weather. To stay informed about Great Lakes water levels and flooding, visit the Ontario flood forecasting and warning program website at https://www.ontario.ca/flooding.

Additional information can also be found at https://www.ijc.org/en/lsbc, and https://ijc.org/en/loslrb.

Information on current water levels and marine forecasts

Daily levels: Current daily lake-wide average levels of all the Great Lakes are available at https://lre-wm.usace.army.mil/reports/greatLakes/greatLakesLevelsThisMonth/greatLakesLevelsThisMonth.html. The daily average water level is an average taken from a number of gauges across each lake and is a good indicator of the overall lake level when it is changing relatively rapidly due to recent high precipitation.

Hourly levels: Hourly lake levels from individual gauge sites can be found at the Government of Canada Great Lakes Water Level Gauging Stations website at https://canada-preview.adobecqms.net/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data.html. These levels are useful for determining real-time water levels at a given site, however, it should be noted that they are subject to local, temporary effects on water levels such as wind and waves.

Marine forecasts: A link to current Government of Canada marine forecasts for wave heights for each of the Great Lakes can be found at https://www.canada.ca/en/environment-climate-change/services/water-overview/quantity/great-lakes-levels-related-data.html under the "Wave and wind data heading". Current marine forecasts for Lakes Superior, Huron, Erie and Ontario are available by clicking on the link of the lake in which you are interested. To view a text bulletin of recent wave height forecasts for all of the Great Lakes, click on the "Text bulletin wave height forecasts for the Great Lakes and St. Lawrence River" link.

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En162-1E-PDF
ISBN 1925-5713
EC22024

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